LINKING LAND COVER CHANGES IN THE SUB-ALPINE AND MONTANE BELTS TO CHANGES IN A TORRENTIAL RIVER

Yasmina Sanjuán , Amelia Gómez-Villar , Estela Nadal-Romero , Javier Álvarez-Martínez , José Arnáez , María P. Serrano-Muela , Juan Manuel Rubiales , Penélope González-Sampériz , José M. García-Ruiz

ABSTRACT

Channel changes are the consequence of changes in sediment yield from the slopes and in the connectivity between slopes and channels because of distinct land use and climate impacts. In this study, we investigated the characteristics and evolution of a short reach in the headwater of the Ijuez River, central–southern Pyrenees. Assessment of a series of sedimentary and geomorphic structures confirmed major changes to the valley bottom, mainly related to changes in the intensity of human activity. The oldest sedimentary structure is a terrace level located 3 to 4 m above the current alluvial plain. General deforestation, overgrazing and recurring fires in the montane belt (1100–1600 m a.s.l.) have led to increased soil erosion and connectivity, and to the triggering of debris flows that have been deposited on the fluvial terrace. Woody fragments from within the debris flows were dated using accelerator mass spectrometry ^{14}C radiocarbon techniques (AMS), yielding ages between 100 and 115 cal years BP, which coincides with the period of maximum deforestation and human density in the Pyrenees. Depopulation and farmland abandonment since the beginning of the 20th century has resulted in generalized natural and artificial reforestation, a shrinkage of the eroded areas and a decline in connectivity between slopes and the channel. The most important consequence has been channel incision and narrowing, and the development of a sediment armour layer. Active sediment transport is continuing, although there has been a decrease in sediment yield from the slopes.